3.0 CORRIDOR OVERVIEW – NORTH CORRIDOR

3.1 Land Use/Developed Areas

SR 32 serves three county seats in the north corridor: Lebanon, Noblesville (shown here) and Anderson.

The North Corridor is currently served by State Route 32, an east-west connector linking Boone, Hamilton and Madison Counties. Important parallel routes within the corridor include SR 38 and 146th Street. SR 38 is a two-lane roadway linking SR 32 with I-69 near the east end of the corridor. 146th Street is a multi-lane facility which has recently been upgraded through much of Hamilton County as a local project.

Other state highways in the corridor include SR 334, SR 238 and SR 47. SR 334 serves as a connector highway between Zionsville and I-65, and SR 238 originates at Noblesville and extends southeasterly through Fortville to Greenfield. SR 47 is an east-west highway serving western Indiana. It crosses I-65 north of Lebanon and terminates at SR 38 near Sheridan. (The roadway continues as 236th Street to Cicero.) Although considered in overall travel forecasting, these three highways are not reviewed in detail in this study.

The communities of Lebanon, Westfield, Noblesville and Anderson are served directly by SR 32. Other cities and towns located within the corridor include Zionsville, Carmel, Fishers, and Pendleton. SR 38 in Hamilton and Madison Counties serves as an important link between SR 32 east of Noblesville and I-69 at Pendleton.

3.2 Demographic Characteristics/Trends

Population – All of the communities in the North Corridor area experienced growth in population between 1990 and 2000, and the growth continues. Significant growth was experienced by Zionsville (66%), Carmel (49%), Fishers (404%), Westfield (181%), and Noblesville (62%).

Households – Studies have shown that households are a greater determinant of travel patterns than population. The number of households in the study area cities and towns grew in a manner similar to population between 1990 and 2000. Those cities and towns experiencing the most growth include Zionsville (67%), Fishers (424%), Noblesville (59%), Westfield (170%), and Pendleton (71%).

Housing Units – Housing unit growth is an indication that urbanization is occurring in areas that were previously undeveloped. The number of new housing units constructed in cities and towns in the study corridor between 1990 and 2000 is another indication of significant growth. The number of housing units in Zionsville increased 65%, Carmel 49%, Fishers 426%, Noblesville 58%, Westfield 175%, and Pendleton 67%.

3.3 Existing Transportation System

A corridor location map showing major transportation facilities, local roadways and incorporated areas in the North Corridor is provided as Figure 3-1.

As with other study corridors, transportation facilities in the North Corridor reflect a strong orientation toward the City of Indianapolis. That is, the highest capacity facilities are north-south, including I-65, I-69, US 421 (Michigan Road), US 31 (Meridian Street), US 431 (Keystone Avenue), SR 37, and Allisonville Road. All of these roadways are multi-lane and most are built to freeway or expressway standards.

East-west roadway capacity is more limited. There is no multi-lane roadway serving "crosstown" traffic through the entire corridor. The highest capacity local route is 146th Street, which has recently been upgraded by Hamilton County to a four-lane arterial between Westfield and Noblesville, and there are plans to extend it further east to I-69. (See Section 3.5, Overview of State and Local Plans.)

As described in Chapter 2, traffic operations for the existing primary state routes have been evaluated based on the procedures of the Highway Capacity Manual 2000 (HCM2000). Estimated travel speed and travel time (delay) are primary determinates of the quality of service. Based on data for the roadways provided by INDOT through the road inventory database, video log data compilation and traffic data from the periodic count program, most of the parameters required to conduct the HCM2000 analysis procedures were readily available for use in this study.

3.4 Overview of Parallel Arterials

As in other study corridors, no continuous local arterials pass through all three counties of the North Corridor. The local grid system of Hamilton County in particular is interrupted at many locations by White River. Local east-west roadways in the other two counties provide greater continuity, but these routes still lack connectivity for long distances without the need to jog on a north-south roadway.

A number of east-west arterials serve portions of the corridor, such as SR 334 in Zionsville, 116th Street and 131st Street in Carmel, and 266th Street through Hamilton and Madison Counties. These routes play important roles in terms of local access and circulation, but they do not provide a continuous route across the three counties of the North Corridor.

Recognizing the need for improvements to east-west travel, Hamilton County recently constructed the 146th Street project. It does not cross the entire study corridor, but it is the only extended multi-lane arterial (east of Spring Mill Road) in the area, and it is one of the longest, beginning at US 52 in Boone County and ending at Cumberland Road. Hamilton County and the City of Noblesville plan to extend 146th Street to link with the SR 38 interchange with I-69 in eastern Hamilton County.

3.5 Overview of State and Local Plans

Interviews were held with INDOT district staff as well as local planning and engineering officials for the purpose of identifying planned and/or programmed roadway improvements near or within the North Corridor. Future projects in early planning or engineering phases will benefit east-west travel within the study area, as follows:

FIGURE 3-1
LOCATION MAP

See oversized figures file for Chapter 3

- 116th Street Improvements, Carmel and Fishers

  Although it is frequently congested, 116th Street (and its westward extension via SR 334 in Zionsville and Boone County) is one of the few roadways to connect I-69 and I-65 through the North Corridor. A long term program of capacity enhancements for 116th Street has been underway for many years by the City of Carmel and the Town of Fishers. The route was also enhanced by the recent rehabilitation of SR 334 through Zionsville by INDOT. Although it plays an important local role, numerous traffic signals and adjacent development reduce the effectiveness of 116th Street for accommodating the types of regional trips ordinarily served by the state highway system.

- 146th Street Extension, Noblesville and Hamilton County

  The City of Noblesville and Hamilton County have agreed to a joint project to extend 146th Street as a four-lane divided roadway from its current terminus at Cumberland Road easterly to the SR 38 (Greenfield Avenue) interchange with I-69. This 3-1/2 mile project will complete the east-west connection between I-69 and I-65, with four lanes provided east of Spring Mill Road in Carmel. It will also provide access to a new corporate campus proposed by the city and county near I-69. The project is currently in design, with construction expected in 2007.

- SR 32 Reconstruction/Rehabilitation, Boone and Hamilton Counties (INDOT)

  INDOT is planning a major road reconstruction project on SR 32 between SR 39 in Lebanon and a point 1.6 miles west of US 31 (Spring Mill Road) in Hamilton County, where an added travel lane project will be implemented (see next bulleted project.) Although additional lanes will not be provided on this section, improvements will be made to signs, signals and shoulders in addition to pavement repair or replacement. Construction of this project is programmed to occur in 2007 and 2008.

- SR 32 Added Travel Lanes, Westfield (INDOT)

  INDOT has programmed a project for added travel lanes on SR 32 from Spring Mill Road (see previous project) to US 31 in Westfield. Localized travel demand and the actual level of potential impacts in Westfield will be dependent on the outcome of current US 31 environmental studies being conducted by INDOT. This project is programmed for construction in 2006.

- SR 32 Added Travel Lanes, Noblesville (INDOT)

  INDOT plans an added travel lane project on SR 32 from SR 37 to SR 38 on the east side of Noblesville for construction in 2010. INDOT has also identified a long-term need for added travel lanes on SR 32 in Noblesville, but due to right of way impacts, particularly in downtown Noblesville and in residential areas to the immediate east of downtown, the section between Hague Road and SR 37 is currently programmed only for pavement repair or rehabilitation. Construction is scheduled for 2008. Further discussion is provided as part of subsequent detailed route reviews.

- SR 32 Rehabilitation, Anderson (INDOT)

  INDOT plans to reconstruct SR 32 through a major portion of Anderson, between Euclid Drive, four miles west of SR 9, and the west approach to SR 9 (south junction). Signing installation or repair and traffic signal modernization projects are programmed at several intersections along the route in conjunction with the rehabilitation. These projects are programmed for construction in 2008.

- SR 38 Pavement Repair or Rehabilitation, Hamilton County (INDOT)

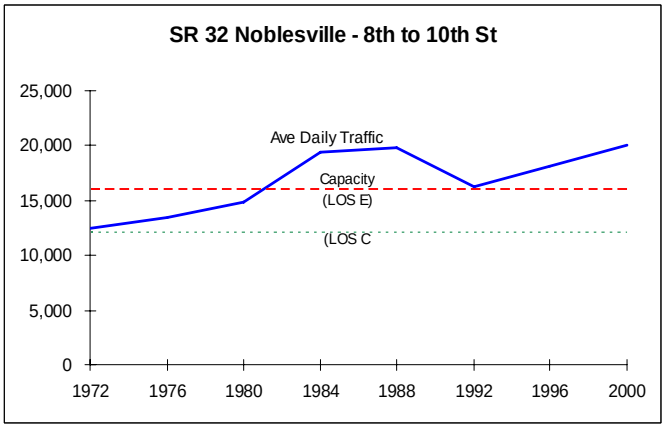
  INDOT is planning a rehabilitation project for SR 38 between US 31 north of Westfield and SR 32 in Noblesville. Signs and traffic signals will also be modernized on this section. Construction is programmed for 2006.

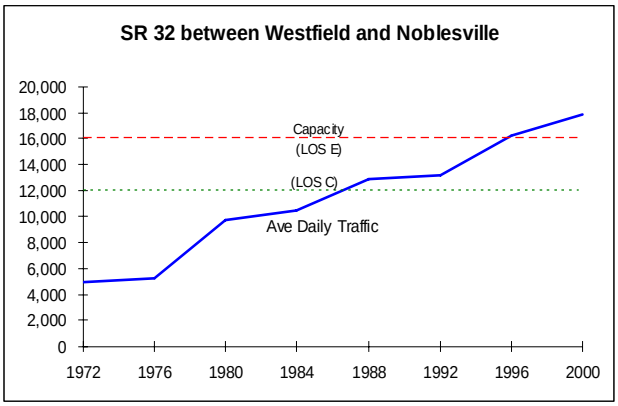
- SR 38 Pavement Repair or Rehabilitation, Madison County (INDOT)

  INDOT is planning a rehabilitation project on SR 38 between I-69 near Pendleton and SR 13 near the Hamilton/Madison County line. Signs and traffic signals will also be modernized on this section. Construction is programmed for 2008.

3.6 SR 32 Traffic Review

SR 32 traffic demand varies by location. Boone County volumes are less than 5,500 vehicles per day (vpd), except in Lebanon, where traffic exceeds 15,000 vpd. The highest traffic volumes occur in Noblesville, where more than 35,000 vpd pass through downtown. The section east of downtown carries over 20,000 vpd on a two-lane urban street. Madison County volumes are lower, although they rise to nearly 14,000 where SR 32 approaches SR 9 in Anderson.





As with other corridors reviewed in this study, traffic volumes drop significantly between urban areas at most locations. An exception is on SR 32 between Westfield and Noblesville. Traffic volumes on this section of roadway have grown steadily for the past 25 years, paralleling the growth of Hamilton County. This section is currently operating at capacity during many periods of the day, and the corridor is not yet "built out" in terms of land use.

3.7 Detailed Route Review – SR 32 (North Corridor)

SR 32 is classified as a rural minor arterial under INDOT's functional classification system in most of Boone, Madison and Hamilton Counties. In the Lebanon, Noblesville and Anderson areas, SR 32 is classified as an urban principal arterial because of its function to move significant volumes of traffic through these areas. The following sections review the existing physical features and factors related to traffic operations for State Route 32 in each county.

State Route 32 – Boone County

SR 32 is a two-lane rural highway through most of Boone County. Only 9.8% of the land use abutting the roadway is classified as urban. There is little congestion on this section of roadway, except for isolated locations within the City of Lebanon.

For purposes of review, SR 32 has been divided into four segments. These segments are generally described as follows:

1. West county line to I-65 (11.0 miles): two-lane, rural
2. I-65 interchange area (0.3 miles): two-lane, rural
3. City of Lebanon (2.1 miles): two-lane, urban
4. Lebanon to east county line (11.1 miles): two-lane, rural

SR 32 is a rural two-lane highway with narrow shoulders through most of Boone County.

A summary of key traffic operational features for SR 32 within Boone County is presented by segment in Table 3A. Figures 3-2 and 3-3 present physical and operational features of SR 32 in Boone County by mile point.

Table 3A: Key Operational Features

SR 32 -- Boone County	Segment				
Data	1	2	3	4	County Total
Length	11.0 mi	0.3 mi	2.1 mi	11.1 mi	24.5 mi
Two-Way Ave Daily Traffic (ADT)	7,300	13,700	7,300	5,400	7,100
Ave One-Way Peak Hour Volume	360	680	360	280	360
Typical Speed Limit	55 mph	55 mph	30 mph	55 mph	50 mph
Ave Operating Speed	45 mph	30 mph	30 mph	40 mph	40 mph
Ave Traffic Signals per Mile	0	6.66	0.95	0	0.16
Ave No Passing Zones per Mile	0.32	1.00	0.48	0.45	0.40
Ave Access Points per Mile	10	47	47	10	14
Ave Peak Hour Level of Service	C – D	D – E	B	D - E	C - D
Accidents per million vehicle miles	0.97*	2.56**	2.56**	1.33***	1.84
	*Jefferson Twp	**Center Twp		***Union Twp	

Figure 3-2: Physical Features - SR 32, Boone County

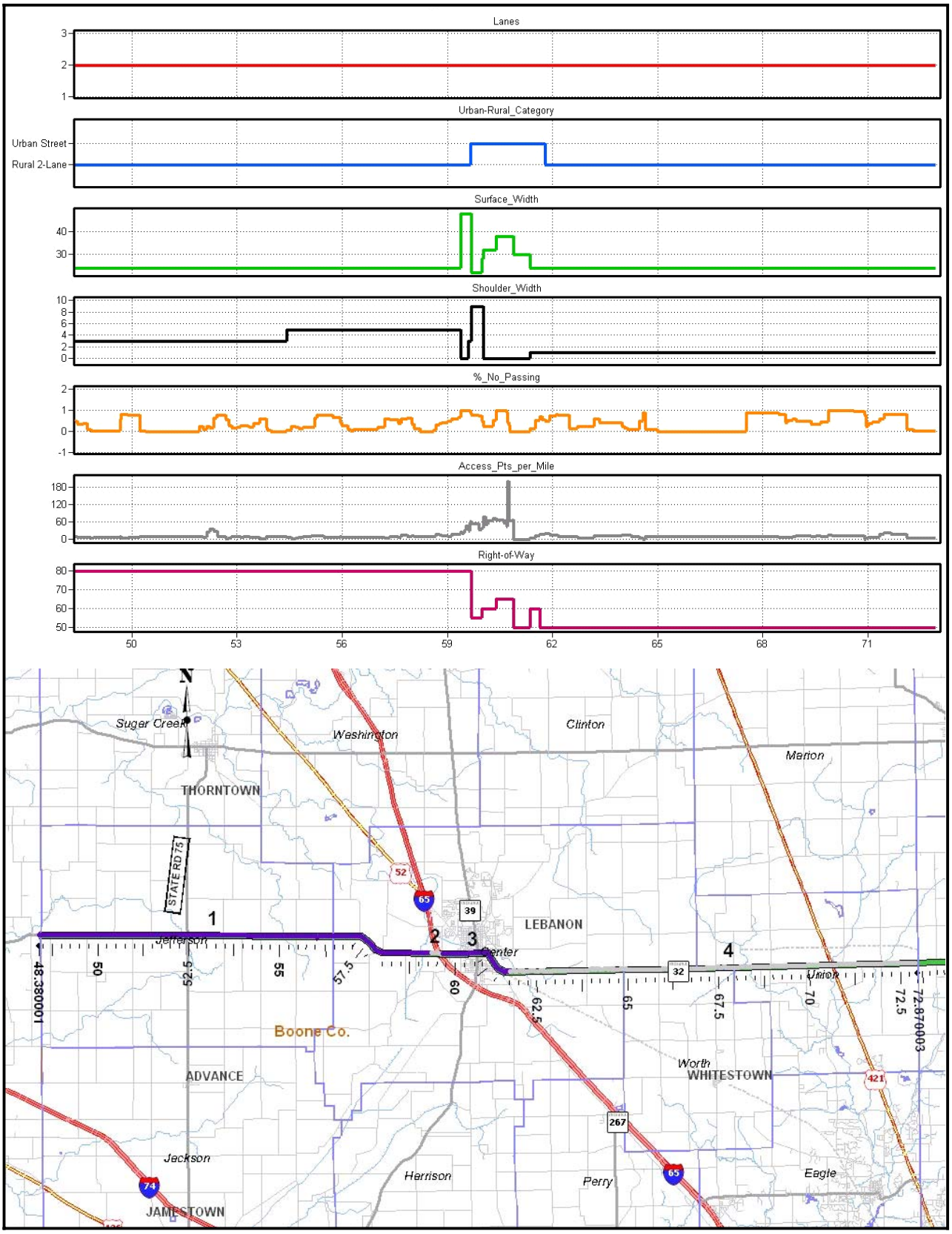


Figure 3-3: Traffic Operations – SR 32, Boone County

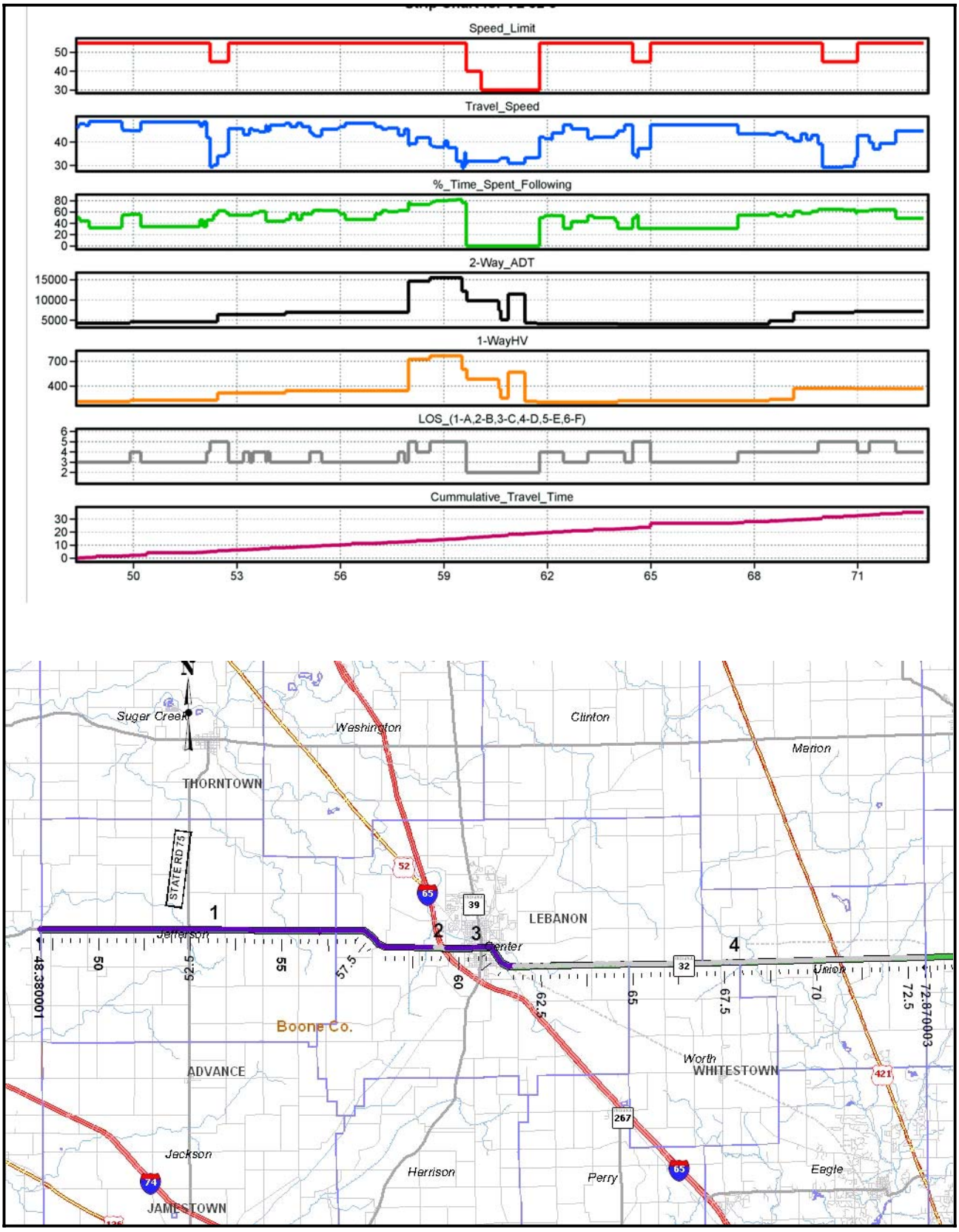


Figure 3-2 presents the physical features by mile point for SR 32 through Boone County. It is a two-lane rural roadway with two- to four-foot shoulders over the full length, except within Lebanon, where curb and gutter exists on some sections. Rural sections of SR 32 pass through gently rolling countryside and the existing roadway has relatively few curves, resulting in 60% of the route available for passing. Due to minimal access management, there are multiple intersections and drives located over the full length of the roadway. Right-of-way width varies between 80 feet west of Lebanon and 50 feet east of Lebanon.

SR 32 is a two-lane urban street through Lebanon.

Data related to traffic operations on this section of SR 32 are illustrated by mile point on Figure 3-3. The posted speed limit is 55 mph over most of the route. Exceptions occur where SR 32 passes through Lebanon, at one narrow bridge, and at two intersections with other state highways.

Daily traffic volumes are under 10,000 vehicles per day (vpd) except in Lebanon where the peak ADT is 15,500 vpd. Reductions in travel speed occur primarily where speed limits are reduced and where there are passing restrictions in the rural areas. Peak hour traffic operations exhibit an average speed of 40 mph. SR 32 operates at LOS C or better over 53% of the route.

State Route 32 – Hamilton County

SR 32 in Hamilton County is a two-lane highway except for a four-lane section in Noblesville and where auxiliary lanes are provided at major intersections. Approximately 16.4% of the abutting land uses are classified as urban in this area.

About 85% of SR 32 is classified as rural within the county, with exceptions comprised of urban sections in Westfield and Noblesville. There are areas of congestion on this section of roadway, particularly where it passes through Noblesville.

For purposes of review, SR 32 in Hamilton County has been divided into segments, as follows:

SR 32 is a rural two-lane highway except in Westfield and Noblesville

1. County line to Westfield (5.3 miles): two-lane, rural
2. Town of Westfield (1.2 miles): two-lane, urban
3. Westfield to Noblesville (4.6 miles): two-lane, rural
4. City of Noblesville, east of SR 38 (0.5 miles): two-lane, urban
5. City of Noblesville, downtown (0.5 miles): four-lane, urban
6. City of Noblesville, east residential (1.2 miles): two/four-lane, urban
7. Noblesville to county line (7.2 miles): two-lane, rural

A summary of key traffic operational features for SR 32 within Hamilton County is presented by segment in Table 3B. Figures 3-4 and 3-5 present physical and operational features of SR 32 in Hamilton County by mile point.

Table 3B: Key Operational Features

SR 32 -- Hamilton County	Segment							County Total
Data	1	2	3	4	5	6	7	
Length	5.3 mi	1.2 mi	4.6 mi	0.5 mi	0.5 mi	1.2 mi	7.2 mi	20.4 mi
Two-Way Ave Daily Traffic (ADT)	10,500	16,900	18,600	24,400	35,400	24,800	9,700	16,000
Ave One-Way Peak Hour Volume	550	840	1,000	1,140	1,490	1,070	620	800
Typical Speed Limit (mph)	55	35	45	40	35	30	50	45
Ave Operating Speed (mph)	35	25	25	5	20	10	40	25
Ave Traffic Signals per Mile	0	1.70	0.87	2.01	1.93	6.02	0.28	0.83
Ave No Passing Zones per Mile	0.55	0.94	0.60	0.28	0.66	0	0.39	0.49
Ave Access Points per Mile	23	23	25	6	19	20	42	28
Ave Peak Hour Level of Service	D - E	C - D	E	F	C – D	D – E	D - E	D – E
Accidents per million veh miles	3.24*	3.24*	3.24*	3.93**	3.93**	3.93**	1.55+	3.36
		*Washington Twp			**Noblesville Twp		+Wayne Twp	

SR 32 physical features by mile point through Hamilton County are described on Figure 3-4. SR 32 is a two-lane rural roadway over the full length, except within Westfield and Noblesville, where the roadway utilizes city streets with curb and gutter sections. Shoulder widths vary from three feet west of Westfield to ten feet between Westfield and Noblesville. The roadway is relatively straight west of Noblesville, with little vertical or horizontal relief. East of Noblesville, the roadway has gentle curves as it nears the county line.

Capacity through Westfield is limited by narrow width and lack of setbacks within downtown Westfield.

Approximately 51% of SR 32 is available for passing in Hamilton County. There is minimal access control, resulting in multiple intersections and drives over the full length of the roadway. Right of way is generally 50 feet west of Westfield, 110 feet between Westfield and Noblesville, and 70 feet east of Noblesville.

Data related to traffic operations on this section of SR 32 are illustrated by mile point on Figure 3-5. The posted speed limit is 50 or 55 mph on most sections outside Westfield and Noblesville. Daily traffic volumes increase gradually from west to east between Westfield and Noblesville, reaching 35,000 vehicles per day (vpd) in downtown Noblesville.

Figure 3-4: Physical Features - SR 32, Hamilton County

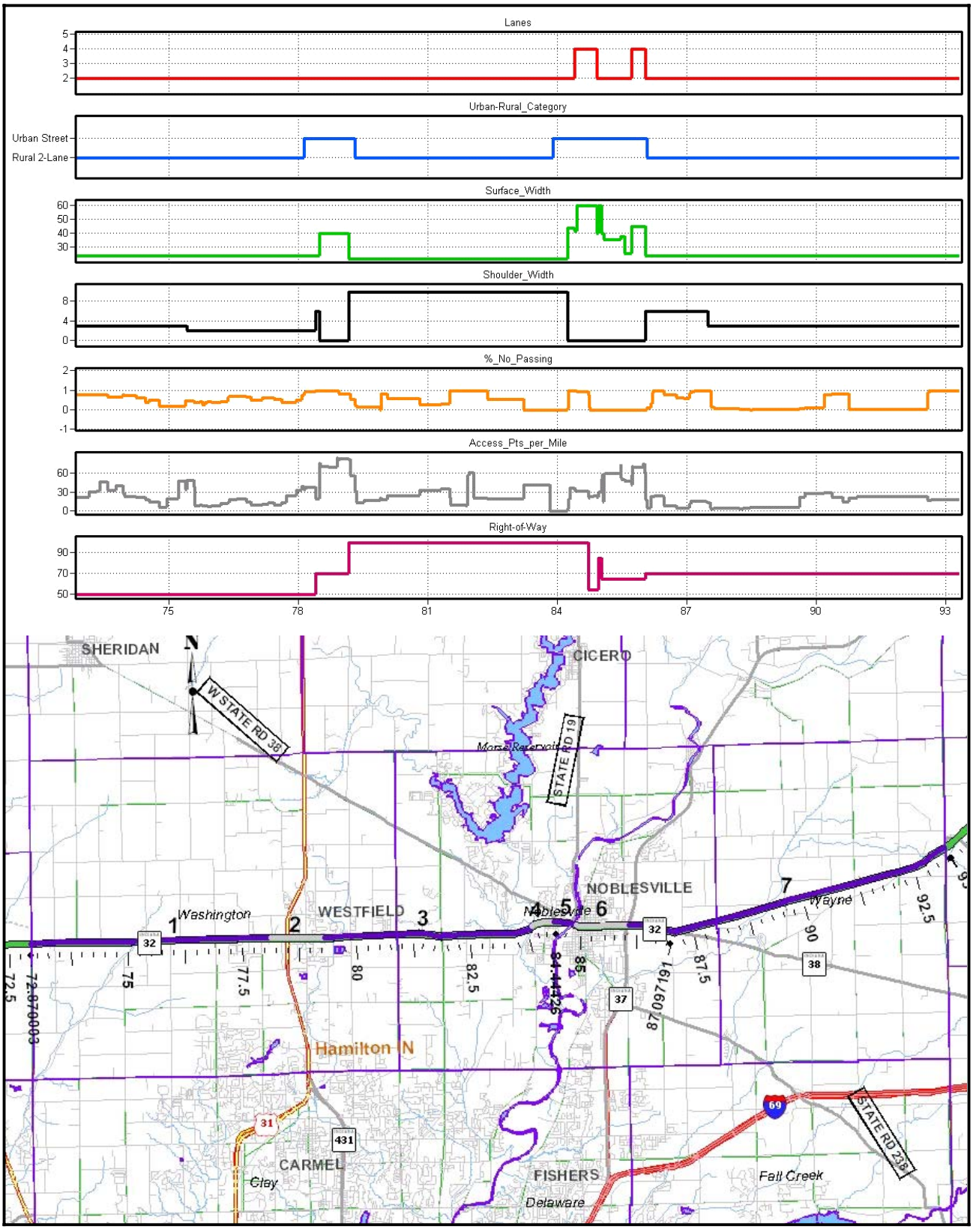
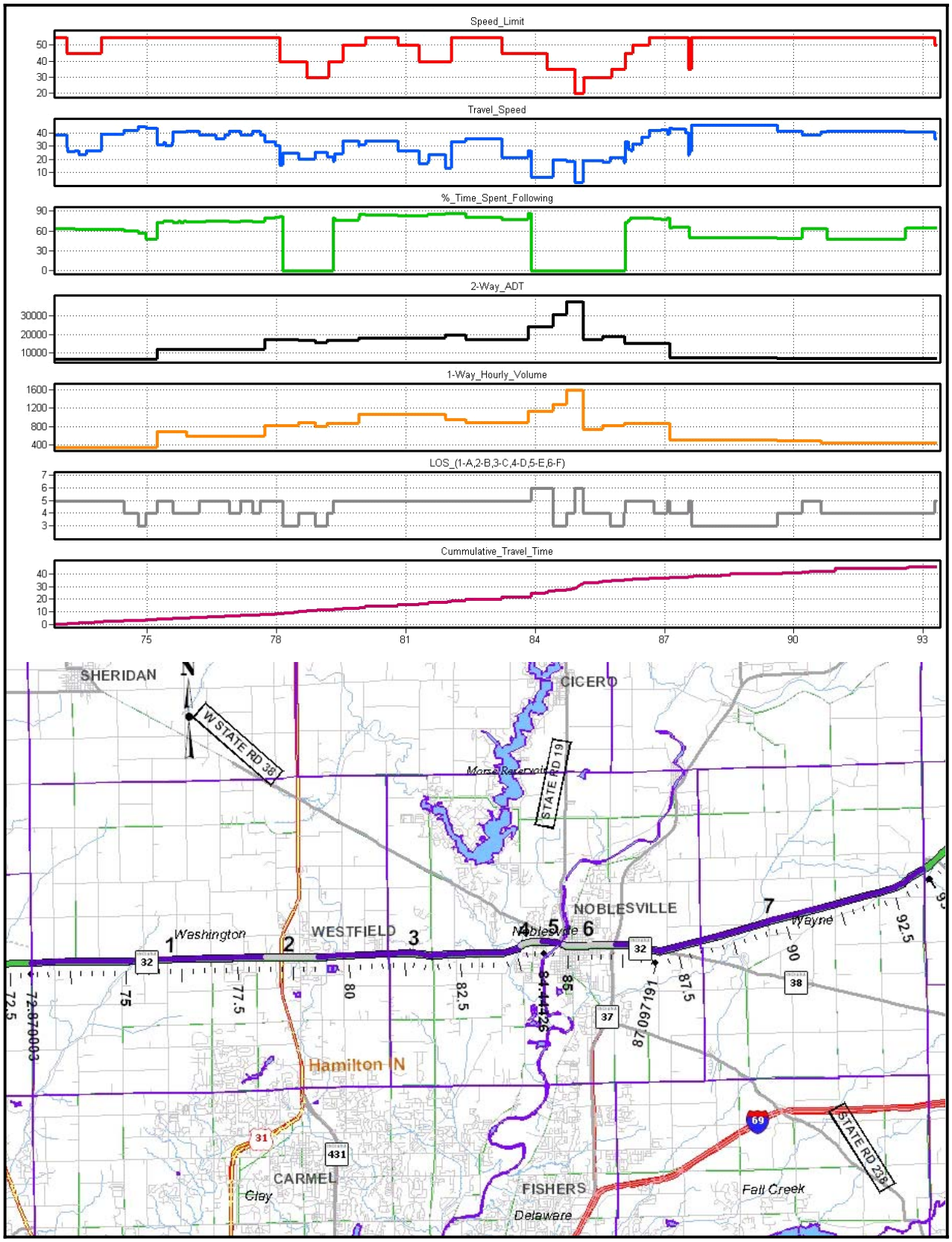


Figure 3-5: Traffic Operations – SR 32, Hamilton County



East of Noblesville, many motorists divert from SR 32 to SR 38 to access I-69.

East of Noblesville, many motorists divert to SR 38 to access I-69 (N) and traffic volumes on SR 32 drop to less than 10,000 vpd. Reductions in travel speed occur primarily where speed limits are reduced through urbanized areas and at passing restrictions in rural areas. Existing traffic operations exhibit an average 25 mph speed and only 17% of the route operates at LOS C or better. The LOS service is often E, with a short section through the SR 32/SR 38 (west junction) intersection operating at LOS F.

State Route 32 – Madison County

SR 32 passes through Town of Fishersburg, Town of Edgewood, City of Anderson, and the Town of Chesterfield in Madison County. It overlaps SR 9 for about a mile in east Anderson.

SR 32 is a two-lane highway except where auxiliary lanes are provided for turning movements and at its approach to SR 9 in Anderson. Approximately 44% of the abutting land uses are classified as urban in this area. Due to its urban character, moderate amounts of congestion are common on this section of roadway.

SR 32 passes through Fishersburg, Edgewood, Anderson and Chesterfield in Madison County

For purposes of review, SR 32 within Madison County has been divided into seven segments based on functional classification and roadway characteristics. These segments are described as follows:

1. County line to Edgewood (5.8 miles): two-lane, rural
2. Edgewood to SR 9 in Anderson (5.7 miles): two-lane, urban
3. SR 9 approach – east (0.2 miles): four-lane, urban
4. City of Anderson (0.7 miles): two-lane, urban
5. Anderson to Chesterfield (1.4 miles): two-lane, rural
6. Town of Chesterfield (0.7 miles): two-lane, urban
7. Chesterfield to county line (7.2 miles): two-lane, rural

A summary of key traffic operational features for SR 32 within Madison County is presented by segment in Table 3C.

Table 3C: Key Operational Features

SR 32 -- Madison County	Segment							County Total
Data	1	2	3	4	5	6	7	
Length	5.8 mi	5.7 mi	0.2 mi	0.7 mi	1.4 mi	0.7 mi	0.7 mi	15.4 mi
Two-Way Ave Daily Traffic (ADT)	6,400	7,800	13,900	13,900	12,700	12,700	12,700	9,300
Ave One-Way Peak Hour Volume	430	420	760	760	760	740	720	530
Typical Speed Limit (mph)	55	35	50	55	45	35	45	40
Ave Operating Speed (mph)	40	30	45	40	30	35	30	35
Ave Traffic Signals per Mile	0	2.64	0	1.39	0	2.67	1.39	1.24
Ave No Passing Zones per Mile	0.38	0.86	0	0.23	0.11	0.21	0.25	0.51
Ave Access Points per Mile	21	27	42	37	29	34	29	32
Ave Peak Hour Level of Service	D - E	B - C	A	A	D - E	A – B	E	B - C
Accidents per million veh miles	2.42*	1.49**	1.49**	1.49**	1.83***	1.83***	1.83***	1.87

*Stoney Creek Twp **Anderson Twp ***Union Twp

Physical features by mile point for SR 32 through Madison County are described on Figure 3-6. SR 32 is a two-lane roadway over the full length except where it approaches SR 9 in Anderson. West of Anderson, the roadway is generally rural, with a shoulder width of approximately three feet. In Edgewood and Anderson, the roadway utilizes city streets flanked by curb and gutter sections. The predominant physical conditions are level terrain, with few horizontal curves west of Anderson.

Approximately 56% of the roadway is available for passing within Madison County. SR 32 has minimal access control in Madison County, resulting in multiple intersections and drives over the full length of the roadway. Right of way is generally 70 feet west of Anderson and 50 to 60 feet within the city.

Data related to traffic operations on this section of SR 32 are illustrated by mile point on Figure 3-7. The posted speed limit is 55 mph where SR 32 enters Madison County from the west, then gradually reduces to 30 mph as the roadway passes through Edgewood and enters Anderson. Reductions in travel speed occur in a similar manner as the roadway changes from rural to urban. The average operating speed of SR 32 in Madison County is 40 mph.

3.8 Strategies to Maximize System Efficiency – SR 32

SR 32 varies significantly in character as it passes from one community to another within the North Corridor. In Boone County (outside the City of Lebanon), traffic volumes are relatively low, operating speeds are high, and accident rates are low. The roadway becomes more congested in Hamilton County, although shoulder widths and overall design standards are improved. Operating conditions improve again in Madison County, until SR 32 enters Anderson, where it becomes a busy city street.

Most of SR 32 operates reasonably well for an older state highway in limited right of way with little access control. Some degree of congestion occurs at each location where SR 32 passes through the center of an urban area, but it is most severe between and within Westfield and Noblesville. Adding travel lanes between these communities is feasible, but it would be disruptive near the downtown areas

Figure 3-6: Physical Features – SR 32, Madison County

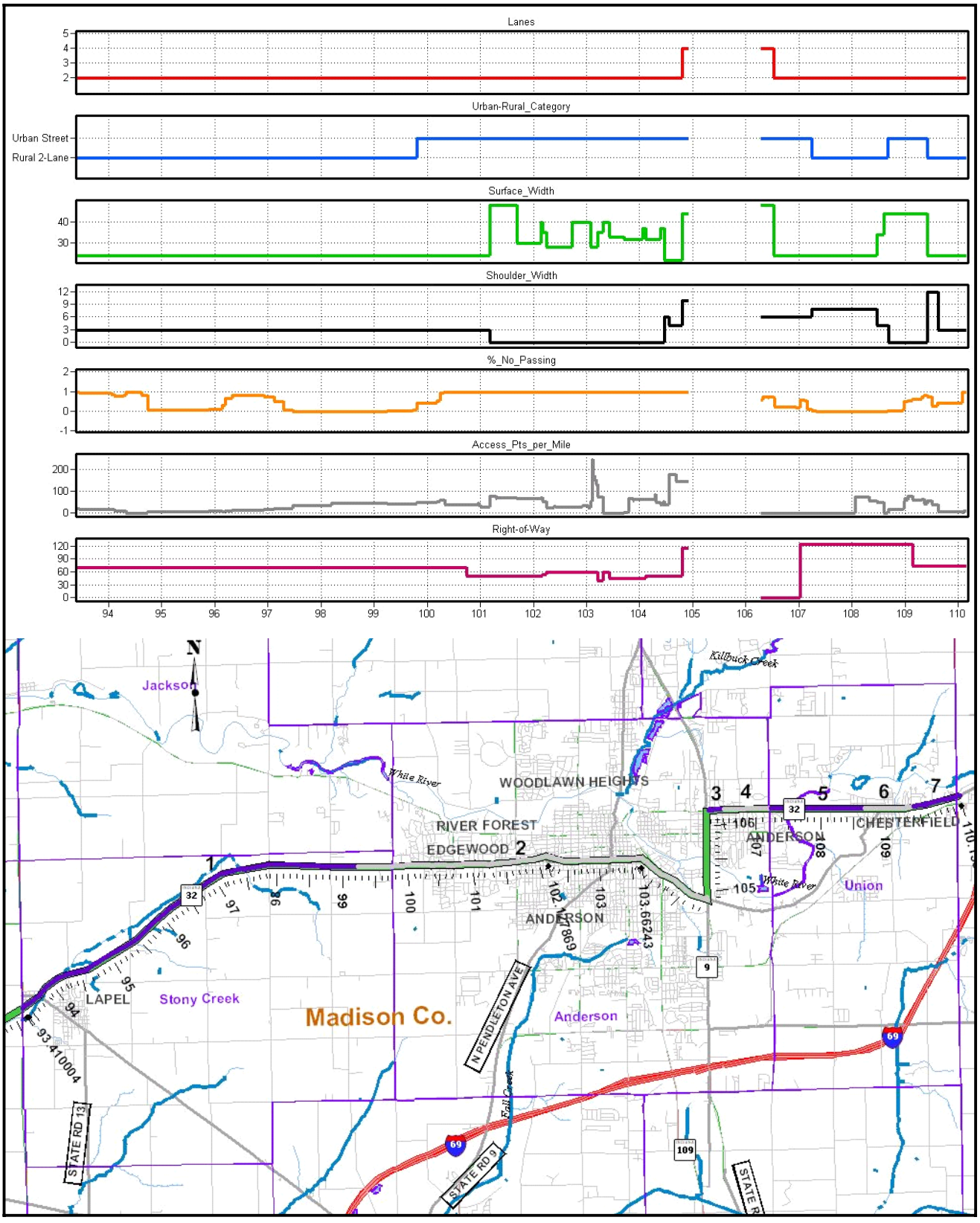
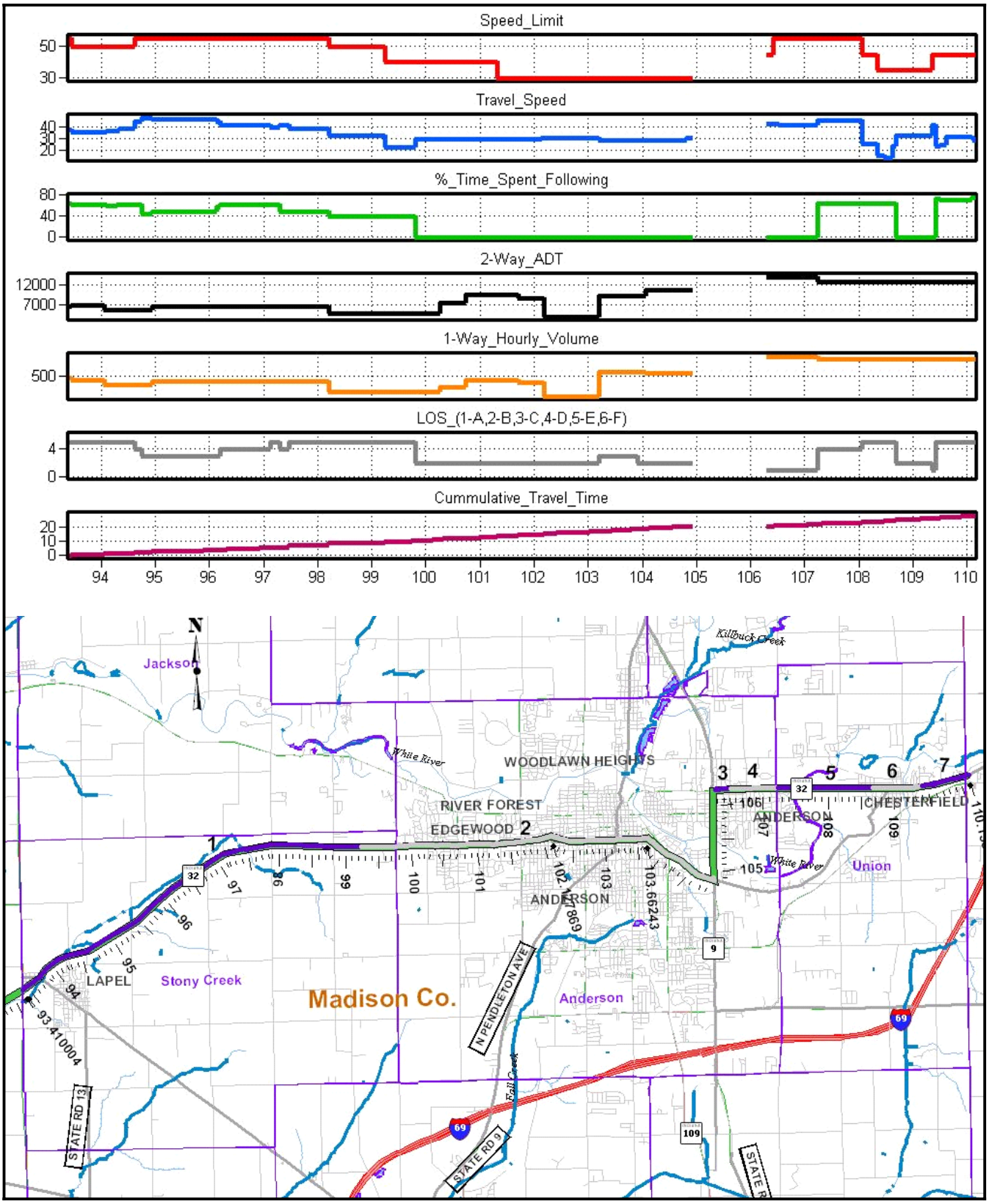


Figure 3-7: Traffic Operations – SR 32, Madison County



where the highway is fronted by well established neighborhoods and commercial districts. INDOT is evaluating future improvements in the context of other major transportation projects being planned for the region. Meanwhile, it is important to gain the greatest benefit from the existing facility.

Following is a review potential strategies to increase existing system efficiency to better serve current users of SR 32.

Access Management. The number of access points per mile on SR 32 is low (less than 10 per mile) in the rural sections of Boone County, but is much higher throughout the rest of the study area. Generally, rural areas of Hamilton and Madison County have 20 to 30 access points per mile and urban areas have 30 to 40 access points per mile. These high rates of access relate to the degree of development of the North Corridor and the general lack of access management during the highway's evolution.

Passing restrictions and minimal access control are the primary limitations to capacity on SR 32.

Correction of these deficiencies would require major reconstruction, most likely including extensive sections of new alignment. Access management will no doubt be a consideration by INDOT as they assess future plans for this corridor, but realistically, major actions on the mature sections of this corridor are not likely. As sections are reconstructed or if new alignments are provided, such as a "bypass" of any of the communities in the corridor, sound access management principles should be applied at every opportunity.

It should be noted that high accident rates (3 to 4 accidents per million vehicle miles) exist on extended sections of SR 32, including virtually all sections in Hamilton and Madison Counties. If access management strategies were successful, that would no doubt be a factor in improving the route's safety. Additional capacity and the application of modern design standards would also contribute to the reduction of accidents on SR 32.

Traffic Engineering Improvements. Opportunities to improve conditions through traffic engineering improvements are limited in the urbanized areas of Lebanon, Westfield, Noblesville and Anderson since SR 32 passes directly through the central business districts of each community. In most cases, INDOT has already modernized traffic signals and installed turn lanes where reasonably feasible. Most recently, traffic signals and extended auxiliary lanes have been provided between Westfield and Noblesville at SR 32 intersections with Hazeldell/Little Chicago Road and Pebblebrook.

Traffic operations could be improved in the City of Lebanon by providing auxiliary turning lanes at the "jogs" that exist on SR 32, particularly those to and from Indianapolis Boulevard (See Figure 3-8). In addition, there are extended sections of SR 32 that pass through commercial areas with numerous driveways accessing the roadway in Lebanon. These sections

FIGURE 3-8
LEBANON URBAN AREA DETAIL

See oversized figures file for Chapter 3

may be candidates for provision of a three-lane roadway in the future, with a two-way left turn lane in the center. In most cases, this could be accomplished with pavement markings.

The potential exists to improve conditions on the most congested section of SR 32 where it shares an alignment with SR 38 in Noblesville by creating a one-way pair through the city. Nearby options for designating the other roadway in the pair include Clinton Street, Logan Street, and Cherry Street (See Figure 3-9). Alternate bridge crossings could utilize Logan Street or Field Drive. It has even been suggested that Pleasant Street be used, eight blocks to the south. A "jog" on city streets would be necessary to enter or leave the one-way pair. Most likely, 6th Street and 17th or 19th Streets would provide this transition.

The option of creating a one-way pair through Noblesville has been considered in the past. It has not been accomplished due primarily to the fact that parallel routes pass through mature residential areas, many that are historical in nature, and these neighborhoods are not generally suitable for large volumes of through traffic.

Ultimately, any one-way pair solution through Noblesville would need the cooperation and leadership of local officials, where there has been little interest in diverting traffic to parallel streets. There simply are no easy solutions that rely on existing roadways. Trade-offs will require judgments regarding accepting high congestion levels (the "do nothing" alternative) or accepting the impacts of shifting traffic to parallel routes. Local input would be essential in this decision.

The best solution would be an alternate route that diverts traffic from downtown Noblesville. Potentially, this new roadway could be constructed on an alignment with fewer impacts, improved geometric standards and better opportunities for access management.

Most likely, an alternate route would involve the provision of a new bridge across White River. There are a number of constraints, not the least of which is the east-west barrier formed by Morse Reservoir, located just north of SR 38 on the west side of Noblesville. This issue is discussed further in Section 3.12.

East-west capacity through the north corridor is limited by the number of bridges available for crossing White River.

Realistically, there are few opportunities to improve traffic operations on urban sections of SR 32 in Madison County. Traffic flow might be improved in Edgewood and Anderson with the addition of auxiliary lanes at a few locations. The signalized intersection in Edgewood currently operates with two-lane approaches in each direction. Right turn lanes could be added as warranted in the future. In Anderson, auxiliary turn lanes might improve flow where SR 32

FIGURE 3-9
NOBLESVILLE URBAN AREA DETAIL

See oversized figures file for Chapter 3

jogs just west of downtown. These improvements should be considered when the need is indicated by traffic demand.

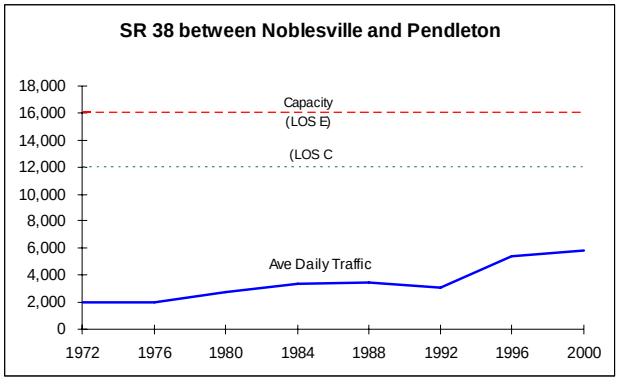
Given the rapid rate of growth in all of the communities served by SR 32 and associated changing traffic patterns, traffic signal timing at major intersections along the route should be reviewed on a periodic basis to ensure consistency with any changes in localized traffic demand.

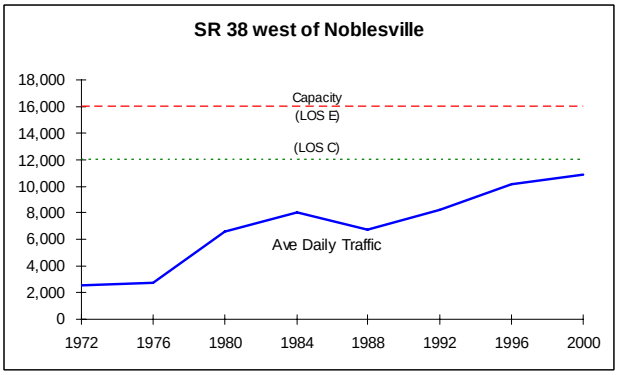
Intelligent Transportation Systems (ITS). The high accident rate on SR 32 might suggest improved incident detection and response systems in this corridor. That should be a consideration in future rehabilitation plans. Given the high traffic volumes in the area, another opportunity for effective utilization of ITS would be in the area of motorist information. The motorist information component of the regional ITS system would allow motorists to choose among alternate corridors while still on SR 32 if the information were sufficiently informative and timely. This could occur with changeable message signs at key locations or by a broader approach such as highway advisory radio (HAR). Consideration should be given to these opportunities as appropriate within an overall regional ITS strategy.

Transportation Demand Management (TDM). Staggered work hours, ridesharing and flexible working hours may be beneficial in Noblesville and Anderson, where there is a concentration of office and commercial land use in the vicinity of SR 32. These potential actions would best be initiated by the city leaders as these areas continue to build out and the roadways become more congested.

3.9 SR 38 Traffic Review

Traffic flow on SR 38 is relatively low except where the highway passes through the urbanized areas of Sheridan, Noblesville and Pendleton. Even in these areas, it does not generally operate over capacity, although speed reductions in towns may reflect poor operations. Congestion does occur where SR 38 shares an alignment with SR 32 through Noblesville (see previous section). Average daily traffic volumes over the remainder of the route are generally below 10,000 vehicles per day.





Traffic volume trends on SR 38 indicate that the roadway is beginning to be influenced by the expansive growth occuring in the North Corridor. One of the higher volume sections is located just west of Noblesville where SR 38 approaches SR 32, with an average daily traffic volume of approximately 11,000 vehicles per day. Traffic levels in Madison County are somewhat lower, although they exceed 13,000 vehicles per day where SR 38 approaches SR 9 in Pendleton.

3.10 Detailed Route Review – SR 38 (North Corridor)

The review of SR 38 commences in Hamilton County rather than Boone County since only a small segment of the roadway exists in Boone County. West of Sheridan, SR 38 is located outside the influence area of the North Corridor.

SR 38 is classified as a rural major collector under INDOT's functional classification system in Hamilton and Madison Counties, except where it passes through the urbanized areas of Noblesville and Pendleton. In these areas, SR 38 is classified as a rural minor arterial and urban principal arterial because of its function to move significant volumes of traffic through the area.

State Route 38 – Hamilton County

SR 38 in Hamilton County is a two-lane highway for its full length, linking the Town of Sheridan in the northwest corner of the county with Noblesville and Pendleton to the east. Around 97% of the abutting land uses are classified as rural, and the route itself is classified as rural, except where SR 38 joins SR 32 in Noblesville. There are no areas of significant congestion on this section, except within Noblesville.

SR 38 is an urban street through Noblesville.

For purposes of review, the SR 38 corridor within Hamilton County has been divided into four segments. These segments are described as follows:

1. West county line to US 31 (9.8 miles): two-lane, rural
2. US 31 to Noblesville (3.5 miles): two-lane, rural
3. City of Noblesville (0.6 miles): two-lane, urban
4. Noblesville to east county line (5.3 miles): two-lane, rural

A summary of key traffic operational features for SR 38 within Hamilton County is presented by segment in Table 3D.

Table 3D: Key Operational Features

SR 38 -- Hamilton County	Segment				
Data	1	2	3	4	County Total
Length	9.8 mi	3.5 mi	0.6 mi	5.3 mi	19.2 mi
Two-Way Ave Daily Traffic (ADT)	4,600	11,200	11,200	5,300	6,400
Ave One-Way Peak Hour Volume	280	600	560	250	360
Typical Speed Limit	45 mph	55 mph	40 mph	55 mph	50 mph
Ave Operating Speed	45 mph	40 mph	20 mph	40 mph	40 mph
Ave Traffic Signals per Mile	0.10	0.57	3.12	0	0.26
Ave No Passing Zones per Mile	0.65	0.73	0.92	0.60	0.66
Ave Access Points per Mile	24	15	61	13	21
Ave Peak Hour Level of Service	D - E	D - E	D	D - E	D - E
Accidents per million vehicle miles	NA	NA	NA	1.12*	1.12*

*Wayne Twp only

Physical features by mile point for SR 38 through Hamilton County are described on Figure 3-10. It is a two-lane rural roadway over the full length, except within Noblesville, where the roadway utilizes city streets flanked by curb and gutter sections. Shoulder widths vary from two to four feet except where curb and gutter sections are provided in Noblesville and Sheridan. The roadway is relatively straight, with little vertical or horizontal relief.

Approximately 34% of the SR 38 roadway is available for passing within Hamilton County. There is minimal access control on SR 38, resulting in multiple intersections and drives over the full length of the roadway. The existing right of way width is generally 80 feet between Sheridan and Noblesville and 60 feet between Noblesville and the east Hamilton County line.

Data related to traffic operations on this section of SR 38 are illustrated by mile point on Figure 3-11. The posted speed limit is generally 50 or 55 mph outside Sheridan and Noblesville. Reductions in travel speed occur primarily where speed limits are reduced through urbanized areas and within no-passing zones in the rural areas. Existing traffic operations exhibit an average 40 mph speed and most of the route operates at LOS D or E.

Operations in downtown Noblesville are often at LOS F due to the limitations of the downtown setting and traffic concentrations near limited crossing points of White River. Level of service is also reduced in Sheridan where the roadway passes through residential areas.

State Route 38 – Madison County

SR 38 is a two-lane highway at all locations in Madison County. Approximately 10% of the abutting land uses are classified as urban in this area. Most of the route is classified as rural within the county. The only exception is the presence of an urban section within the Town of Pendleton.

There are few areas of significant congestion on SR 38 in Madison County, with possible exceptions occurring within downtown Pendleton and the nearby approach to the I-69 interchange during peak periods of travel.

SR 38 is a two-lane, rural roadway with narrow shoulders through Madison County, except within the Town of Pendleton

For purposes of review, SR 38 within Madison County has been divided into four segments, as generally described below:

1. West county line to I-69 (5.0 miles): two-lane, rural
2. I-69 to Pendleton (0.7 miles): two-lane, rural
3. Town of Pendleton (1.6 miles): two-lane, urban
4. Town of Pendleton (8.3 miles): two-lane, rural

Figure 3-10: Physical Features – SR 38, Hamilton County

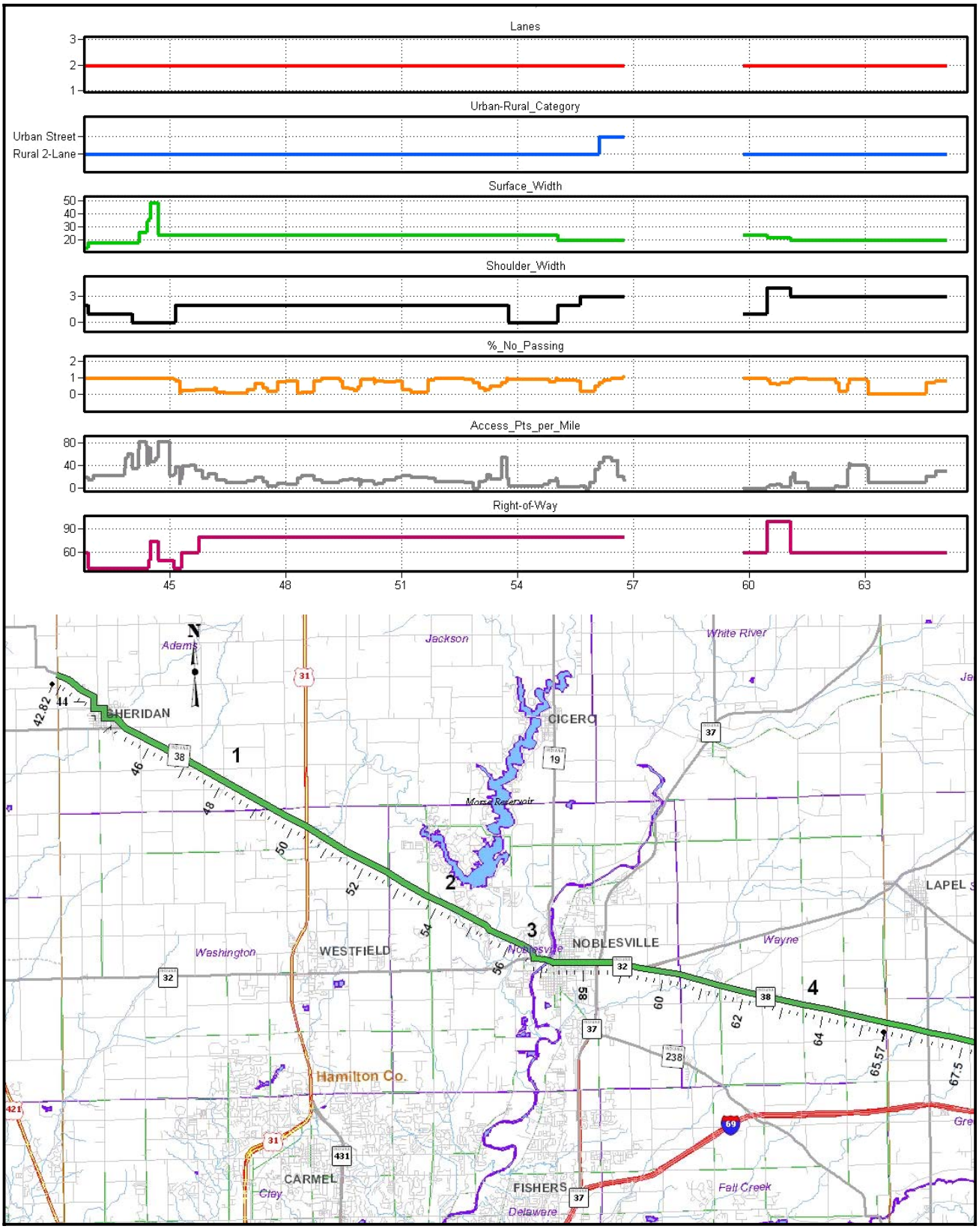
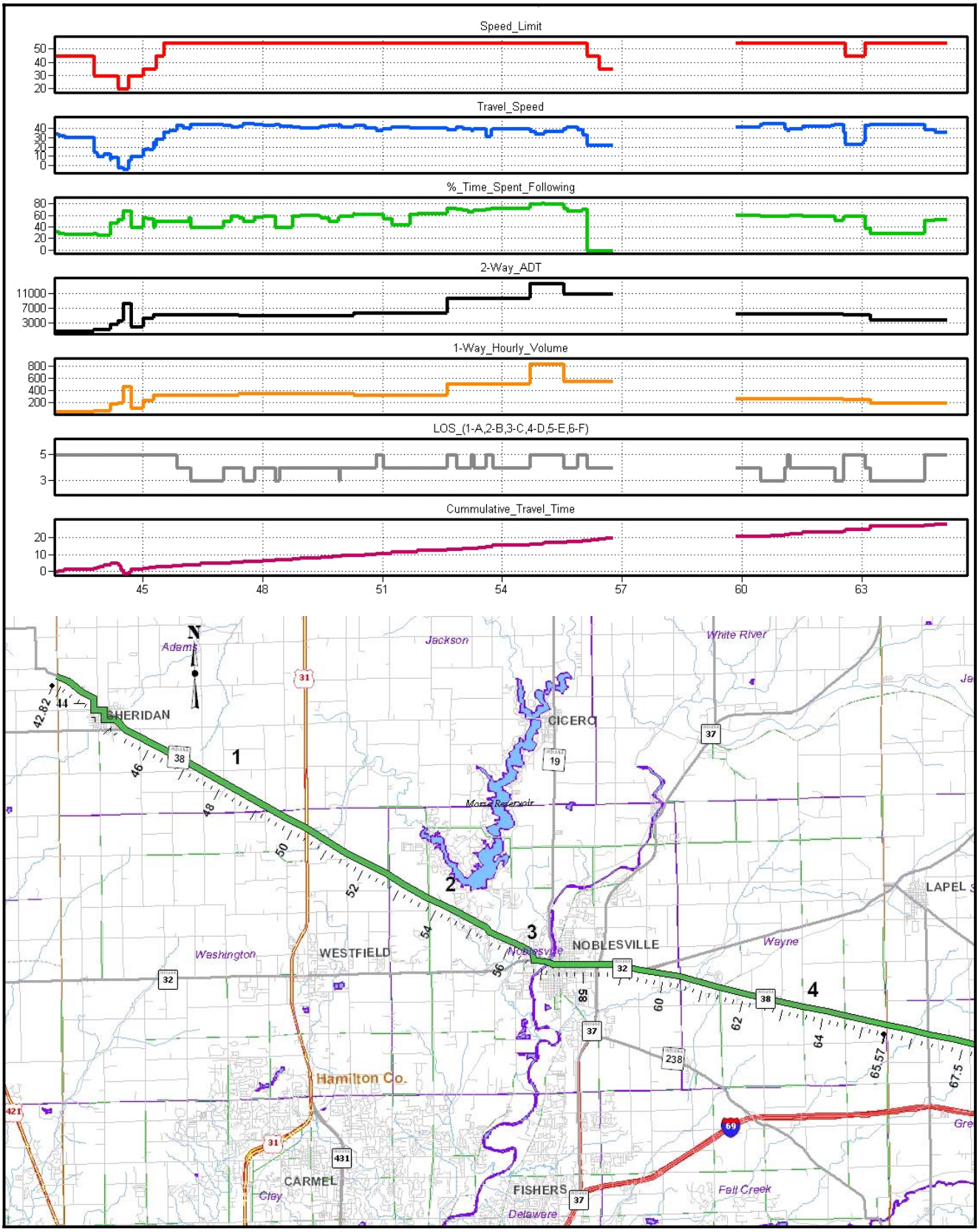


Figure 3-11: Traffic Operations – SR 38, Hamilton County



A summary of key traffic operational features for SR 38 within Madison County is presented by segment in Table 3E.

Table 3E: Key Operational Features

SR 38 -- Madison County	Segment				
Data	1	2	3	4	County Total
Length	5.0 mi	0.7 mi	1.6 mi	8.3 mi	15.6 mi
Two-Way Ave Daily Traffic (ADT)	3,200	9,500	10,800	4,000	5,800 vpd
Ave One-Way Peak Hour Volume	180	650	690	270	370
Typical Speed Limit	55 mph	50 mph	30 mph	50 mph	45 mph
Ave Operating Speed	45 mph	35 mph	35 mph	40 mph	40 mph
Ave Traffic Signals per Mile	0.00	0.00	1.24	0.00	0.13
Ave No Passing Zones per Mile	0.31	0.30	0.81	0.38	0.40
Ave Access Points per Mile	13	25	48	22	22
Ave Peak Hour Level of Service	C - D	E	B	C - D	C - D
Accidents per million vehicle miles	1.09*	1.09*	2.73**	NA	

*Green Twp **Fall Creek Twp

Physical features by mile point for SR 38 through Madison County are described on Figure 3-12. SR 38 is a two-lane roadway over the full length, except within Pendleton, where auxiliary lanes are provided. Shoulder widths are generally two feet on all sections of SR 38 in Madison County except for the urban section in Pendleton and at the approaches to the interchange with I-69. The roadway utilizes city streets flanked by curb and gutter sections within Pendleton.

The SR 38 roadway alignment is relatively straight, with little vertical or horizontal relief. Approximately 60% of the roadway is available for passing within Madison County. There is minimal access control on SR 38, resulting in multiple intersections and drives over the full length of the roadway.

SR 38 has an existing right of way width of 60 feet except within Pendleton, where it narrows to 50 feet at some locations. Opportunities to widen the roadway are limited in Pendleton by the presence of sidewalks and the proximity of downtown buildings, but the opportunity does exist to provide auxiliary lanes through the elimination of on-street parking.

Data related to traffic operations on this section of SR 38 are illustrated by mile point on Figure 3-13. The posted speed limit is 50 to 55 mph on most sections outside Pendleton. Daily traffic volumes are approximately 12,000 in downtown Pendleton, but are much lower (less than 5,000 vehicles per day) on other sections.

Traffic operations in downtown Pendleton are typical of a two-lane highway passing through an urban area. West of Pendleton, many motorists divert to SR 38 to access I-69, and traffic volumes on SR 38 are approximately 10,000 vehicles per day between Pendleton and the I-69 Interchange.

Reductions in travel speed occur primarily where speed limits are reduced through Pendleton and where there are passing restrictions in the rural areas. Existing traffic operations exhibit an average speed of 40 mph, and except between I-69 and Pendleton, the entire route of SR 38 generally operates at LOS D or better.

Figure 3-12: Physical Features – SR 38, Madison County

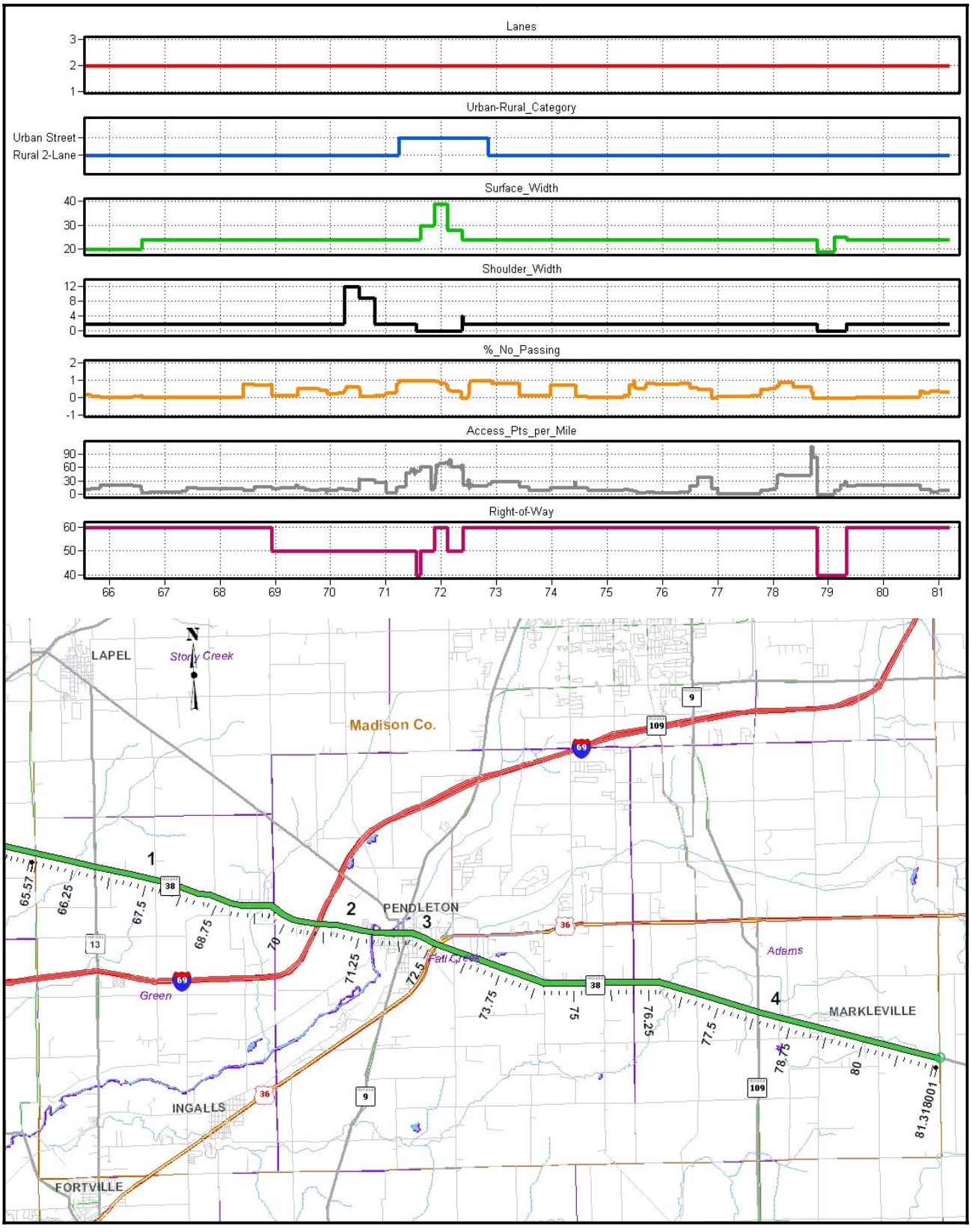
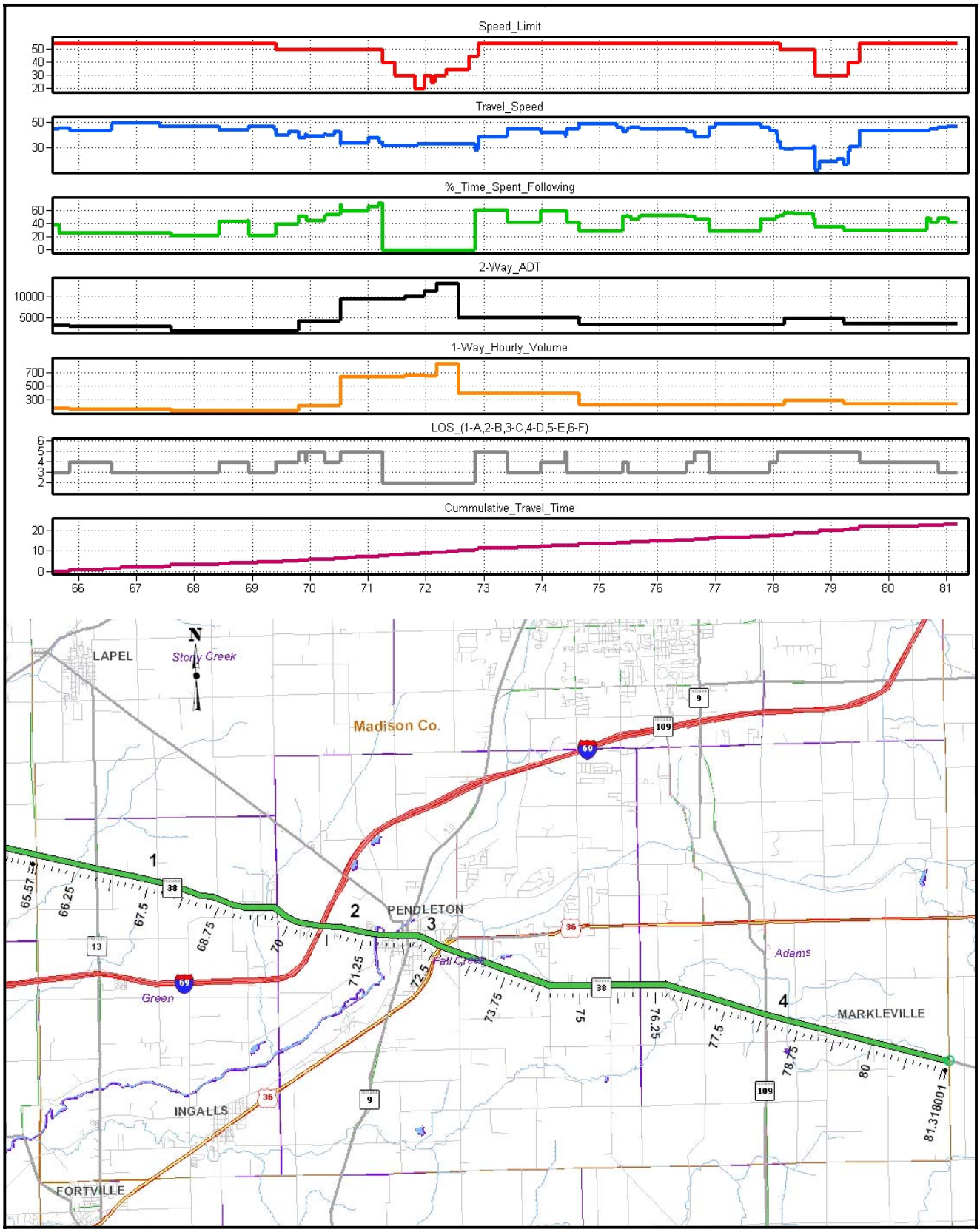


Figure 3-13: Traffic Operations – SR 38, Madison County



3.11 Strategies to Maximize System Efficiency – SR 38

As stated previously, SR 38 does not exhibit congestion problems at most locations. Within rural areas, it is generally well suited for the level of traffic demand it currently serves. The most significant problems on the route occur in Noblesville, where SR 38 shares an alignment along city streets with SR 32. With respect to geometric design, shoulder widths are less than desirable, but the overall condition of the roadway is good.

Following is a review of potential strategies to increase existing system efficiency to better serve current users of SR 38.

Access Management. The number of access points per mile on SR 38 is generally low to moderate (10 to 20 per mile) on most sections. Consistent with the typical character of city streets, a much higher number access points exists in Sheridan, Noblesville and Pendleton. These sections are in the "high" category for access points, compromising both the safety and capacity of the roadway. Correction of these deficiencies would require major reconstruction, most likely including extensive sections of new alignment that bypass these areas. Improved access management would be a major element of any bypass plan, but it is generally not feasible on the urban sections of the existing roadway.

For the most part, adding a non-traversable median on SR 38 is not an option since there are no multi-lane sections. Exceptions may exist in the City of Noblesville, near the intersection of SR 38 and SR 32, where there is a wide pavement section that is marked in some places for auxiliary turn lanes and others for multiple through lanes. A center median might channelize these movements more effectively and provide the additional safety benefit of separating opposing traffic movements.

Access management is not currently a major priority on rural sections of SR 38, but access should be carefully reviewed with development proposals in an effort to maintain the roadway's safety and utility over time. Given the role of SR 38 as a "collector" for local areas to link with the regional highway system, access management restrictions in rural areas would need to be balanced with the local service function of the roadway. Nevertheless, as sections are reconstructed or if new alignments are provided, sound access management principles should be applied at every opportunity.

It should be noted that accident rates on SR 38 are generally low (just over 1 accident per million vehicle miles), except in Noblesville and Pendleton. A rate of 2.73 accidents per million vehicle miles exists on SR 38 in Pendleton. The rate is much higher in Noblesville where SR 38 shares an alignment with SR 32. That rate is almost 4.5 accidents per million vehicle miles (see discussion of SR 32).

Traffic Engineering Improvements. Opportunities to provide better service through traffic engineering improvements are limited in the urbanized areas of Sheridan, Noblesville and Pendleton. In most cases, INDOT has already modernized traffic signals and installed auxiliary lanes where reasonably feasible, particularly as the roadway approaches Noblesville. One location where auxiliary lanes might be considered in the future is at US 31, where SR 38 has two-lane approaches from each direction.

The potential exists to improve conditions on the most congested section of SR 38 where it shares an alignment with SR 32 by creating a one-way pair through the City of Noblesville. This option has been considered a number of times over the years. It has not been accomplished due primarily to the fact that parallel routes pass through mature residential areas that are not generally suitable for large volumes of through traffic. (See discussion of SR 32.)

Given the rapid rate of growth in all of the communities served by SR 38, traffic signal timing at major intersections along the route should be reviewed on a periodic basis to ensure consistency with any changes in localized traffic demand.

Intelligent Transportation Systems (ITS). The high accident rate within Noblesville might suggest improved incident detection and response systems, but that investment is not warranted unless these systems are incorporated with a regional system.

The best opportunities for ITS applications on SR 38 are likely to involve the motorist information component of the regional ITS system. Early information regarding incidents would allow motorists to choose among alternate corridors while still on SR 38 if the information were sufficiently informative and timely. This could occur with changeable message signs at the interchange with I-69, SR 37 or the future interchange with US 31. A more cost effective strategy might be the deployment of a broader approach such as highway advisory radio (HAR). Consideration should be given to these opportunities as appropriate within an overall regional ITS strategy.

Transportation Demand Management (TDM). Staggered work hours, ridesharing and flexible working hours would be most beneficial in Noblesville, where there is a concentration of light commercial uses in the vicinity of SR 38 and SR 32 near and within the downtown area. These potential actions would best be initiated by the City of Noblesville as part of an overall strategy to reduce congestion in and near the downtown area.

3.12 Long Term Considerations for SR 32 and SR 38

As with the other corridors under study, recommendations for meeting the future needs of the North Corridor will be based on forecasted traffic demand for the year 2025. These recommendations will be presented in the Final CISTMS Report. As stated in the Introduction, the purpose of this Base Conditions Report is to document existing conditions and make recommendations for short term improvements.

Although final corridor recommendations cannot be developed without traffic forecasts, some long-term observations can be made at this stage, based solely on the review of existing conditions. These observations, referred to as "long-term considerations," are described below.

In the long term, both SR 32 and SR 38 have the potential to provide good traffic service over most of their length due to relatively straight alignment, absence of sharp vertical curves, and adequate right of way. Although not currently warranted at all locations, the provision of added travel lanes would be feasible on most sections with little disruption to abutting land uses and properties. For these reasons,

these corridors should be preserved, and a reasonable level of access management should be applied to protect these routes for future use.

The opportunity to expand the capacity of SR 32 is limited within the urbanized areas of Lebanon, Westfield, Noblesville and Anderson. There are no major physical constraints to bypassing Lebanon, should that be deemed desirable in the future. An intermediate step, should additional capacity be needed on SR 32, would be to provide a three-lane roadway (with a two-way center left turn lane) through some or all of Lebanon. In most locations, the roadway has sufficient width for this section, with some loss of on-street parking.

Conceivably, Westfield could also be bypassed either to the north or south, but as a part of input to the US 31 environmental studies, Westfield representatives expressed a desire to maintain the alignment of the existing roadway and make it a priority for an interchange with US 31 when it is upgraded to a freeway. Local officials have maintained that it would be possible to provide added travel lanes on SR 32 through Westfield with removal of on-street parking and a limited amount of right of way acquisition. This may require relocation for some businesses and structures, but town officials say that these are not historic or otherwise critical for retention.

The greatest challenge to improving SR 32 in the future will be passing through or around the City of Noblesville. The location of Morse Reservoir abutting the city to the north makes a bypass in that direction either infeasible or potentially ineffective due to the distance from existing trip generators and activity centers.

Some studies have been conducted in the past to identify a corridor for a south bypass of Noblesville. This continues to hold the greatest promise, but finding a suitable route has become increasingly difficult as the area has grown. The Noblesville Thoroughfare Plan indicates a new southern bridge crossing that links with Pleasant Street on the east side of White River and follows an abandoned Conrail Railroad right of way on the west side, as shown on Figure 3-14.

At this point in time, some relocation would be necessary regardless of the route chosen around Noblesville. It would be in the interest of all parties involved to agree on the best route, potentially through a joint planning study, so that further long term impacts can be avoided. This issue will be addressed in the context of 2025 travel demand in the Final CISTMS Report.

SR 32 in Anderson poses challenges similar to those in the other urbanized areas, including extended sections of two-lane roadway with curb and gutter, sidewalks, and residential properties located in close proximity to the edge of pavement. In lieu of adding travel lanes or upgrading SR 32 in the City of Anderson, a better approach for meeting INDOT objectives would probably be to improve SR 38 east of Noblesville. SR 32 would continue to serve travel demand between Noblesville and Anderson and would accommodate traffic internal to Anderson in the same manner it does today. SR 38 would provide direct east-west access to I-69.

Like SR 32, SR 38 is generally a straight roadway without sharp vertical curves. Its right of way is sufficiently wide to provide for added travel lanes in the future. The biggest obstacle on SR 38 is its alignment through the City of Noblesville. The issues and options previously described for SR 32 also apply to SR 38 where they share an alignment through the center of the city.

FIGURE 3-14
NOBLESVILLE THOROUGHFARE PLAN

See oversized figures file for Chapter 3

In terms of parallel routes, the most significant alternative is 146th Street. Developed by Hamilton County as a four-lane controlled access roadway between Spring Mill Road and Cumberland Road, this route already provides a good alternative route for many east-west trips. The planned 3-1/2 mile extension to the I-69 interchange with SR 238 will improve the utility of the corridor even further. The route serves Carmel, Westfield, Noblesville and Fishers (via SR 37). It would be feasible to extend 146th Street through Boone County to provide a multi-lane link between I-65 and I-69. Its location roughly half way between I-465 and SR 32 makes it an excellent companion to these state routes in meeting long term objectives for east-west travel through the North Corridor.

A route that has the potential to provide a more direct option to traveling on SR 32 (at least between Lebanon and Noblesville) is 161st Street. The existing roadway is not designed for use as an arterial, but the corridor is well placed for improvement. In addition, it could provide opportunities to connect with and extend a new roadway crossing of White River (via Cherry Tree Road) if it is placed on or near the Pleasant Street alignment as advocated by the City of Noblesville. (See Figure 3-14.) Currently, 161st Street is a primary arterial in Westfield, and is a secondary arterial in Hamilton County and Noblesville.

The potential for using 146th Street, 161st Street and/or other local routes to relieve future demand on SR 32 will be evaluated in the context of forecasted future needs. All of these considerations will be taken into account when developing year 2025 corridor recommendations for inclusion in the Final CISTMS Report.